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## Cost-Effectiveness of Self-Monitoring of Blood Glucose in Type 2 Diabetic Patients Not Receiving Insulin

Response to Davidson

In his counterpoint article, Davidson (1) argues that self-monitoring of blood glucose (SMBG) in type 2 diabetic subjects not using insulin is a waste of money. However, as the discussions accompanying and following publication of a new meta-analysis by Welschen et al. (2) demonstrate, the evidence is far from conclusive either for or against use of SMBG in this patient group.

As pointed out by Ipp et al. (3), many of the trials of SMBG conducted thus far have been underpowered to detect a significant impact and therefore individually cannot reliably conclude that SMBG does or does not influence HbA<sub>1c</sub> (A1C). In an attempt to bring some clarity to the current situation, Welschen et al. performed a meta-analysis based upon pooling of more recent randomized trials with the conclusion that SMBG affords a modest but significant 0.39% reduction in A1C. According to Davidson, even if this effect is clinically relevant, it is likely to be outweighed by the cost of providing SMBG. To accurately answer that claim, we undertook a cost-effectiveness analysis of SMBG using a Markov state model of diabetes to assess the clinical impact and related cost when SMBG is provided to non-insulin-requiring patients within the German health care system. Assuming a modest improvement in A1C of 0.39%, the result was a slight increase in life expectancy (0.083 years) and reduced cost of complications (70% attributable to microvascular events). This finding is in line with the results of the U.K. Prospective

Diabetes Study, in which a 1% reduction in A1C corresponded to a reduction in complications (4). In our analysis, the cost per life-year gained was ~€31,000 and therefore, from a health insurance perspective, acceptable. Over a 10-year period and taking into consideration cost savings due to reduced complications, SMBG employed at a frequency of seven times/week would account for ~6% of the total direct costs covered by health insurance.

While current evidence is not perfect, it supports, on both clinical and economic grounds, the use of SMBG in type 2 diabetic subjects not using insulin. Therefore, it would be premature to consider withdrawal of this treatment option. As noted by Ipp et al. (3), now is the time for industry to fund large multicenter trials with sufficient power to confirm the findings obtained by pooling small randomized controlled trials.

KURT NEESER, DVM  
KATRINA M. ERNY-ALBRECHT, PHD  
CHRISTIAN WEBER, MD

From the Institute of Medical Informatics and Biostatistics, Basel, Switzerland.

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Address correspondence to Kurt Neeser, Institute of Medical Informatics and Biostatistics (IMIB), Clarastrasse 15, Basel, Switzerland, CH-4058. E-mail: neeser@imib.ch.

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## Cost-Effectiveness of Self-Monitoring of Blood Glucose in Type 2 Diabetic Patients Not Receiving Insulin

Response to Neeser et al.

Neeser et al. (1) challenge my argument that self-monitoring of blood glucose (SMBG) in type 2 diabetic patients not taking insulin is not beneficial for lowering glycemia and therefore is a waste of (a lot of) money (2).

In a meta-analysis of six randomized controlled trials, Welschen et al. (3) found a significant reduction of 0.39% in HbA<sub>1c</sub> (A1C) levels in type 2 diabetic patients not taking insulin who performed SMBG. Welschen et al. did point out that the reduction was only significant in two of the trials and that the conclusion that SMBG was beneficial “should be interpreted with caution, as the methodological quality of the trials . . . was limited in four of the six included studies.” A large number of nonrandomized studies were also negative (2,3). Be that as it may, Neeser et al. (1), using a Markov model on data from the German health care system, state that a 0.39% reduction of A1C levels resulted in a 30-day (0.083 years) increase of life expectancy and “reduced cost of complications (70% attributable to microvascular events).” The cost per life-year gained was ~€31,000 (or \$36,400) and “therefore, from a health insurance perspective, acceptable.” They conclude that it is “premature to consider withdrawal of this treatment option” and suggest that industry should fund large multicenter trials to determine whether SMBG is helpful in this situation.

Several points can be made in response. Although we are not given the costs of SMBG in non-insulin-requiring patients in the German health care system, I would emphasize that in the U.S., a conservative estimate of the cost of SMBG in these patients is nearly \$1.5 billion/year (2). This is a tremendous amount of money for an activity for which there is little (to be charitable) or no evidence for a beneficial outcome. If this were a drug, it certainly would not have received Food and Drug Administration approval. In a sense, therefore, SMBG in patients not taking insulin represents a very expensive “off-label” use. Of course, calls for larger